ISSN 2319 – 1953
International Journal of Scientific Research in Computer Science Applications and Management Studies

Google Lens as an Image Classifier

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***Abstract*— Google's Newest Photo Tool can identify what's in Pictures Better than a Human. Artificial Intelligence powered Google Lens can identify types of flowers. At Google I/O 2017 the company showed off its new Google Lens technology. This AI-powered usage makes benefit of visual recognition to provide information about things and objects that smartphone's camera is pointed at such as identifying flower type or providing reviews. This paper aims to classify the images and gives proposal as Google lens as image classifier readily available mobile app in our smart phone.**

***Keywords*- Image Processing, Image classification, Mobile App, Google Lens ("GOOG"), Accuracy.**

I. INTRODUCTION

At present, mobile phone is an important role in our life for communication like calling, messaging etc. Mobile phone replaces numerous of electric and electronic devices in our life nowadays because, all the features are already available in mobile phone. Here we quote a few numbers of examples such as clock, alarm, notes, calculator, telephone directory, calendar, FM radio, music player, memo, camera, photo album and so on. Currently whenever we are in need of the previous devices, MOBILE PHONE is much more enough to all the process. Also in smart phones, there are add up to quantity of preferences whatever we can do it computers. But in this paper, the mobile app, called as Google Lens acts as an image classifier using artificial intelligence and vision techniques.

In the concept of image classification or clustering, we need dataset for both training and testing phase, a better algorithm is one which gives higher accuracy and software or tools to implement. Now, the mobile app, Google Lens can replace all the image processing steps such that there is no need of training phase, algorithm and software. This paper provides a proposal about Google Lens as a classifier in the concept of image classification.

The rest of this paper is organized as follows. Current scenario in image classification is explained in detail with some recent research as examples in section 2. Google Lens as an Image Classifier is described in section 3 and section 4 draws the Results and analysis while Conclusion of the paper with possible tracks of lines to future presented in section 5.

II. CURRENT SCENARIO IN IMAGE CLASSIFICATION

Usually the images are classified according to their attributes like color, size, shape, texture etc. and finally grouping them in to similar group as much as can. Image processing plays an important role in extracting useful information from images. Image processing includes the process of translating an image into a statistical distribution of low-level features is a complicated task since the acquired image data often noisy, and target objects are influenced by lighting, intensity or illumination. Image processing is an essential step for computer-aided plant type's identification in the case of flower classification. The classification of flower images is built on low-level features like texture and color in order to identify image content. Normalized color histogram is used to describe Color features while gray-level co-occurrence matrix is used to describe texture features. Image classification is done as shown in the following figures where the major steps of supervised and unsupervised classification are explained respectively.

Steps:

1. Design image classification pattern: state information classes such as urban, agriculture, forest areas, etc. Review field studies to collect basic and secondary data of the study area.
2. Image Preprocessing, including corrections, enhancement and initial image clustering
3. Select representative areas on the image to analyze results of the initial clustering or to generate training signatures.
4. Image classification
    a. Supervised mode: using training signature
    b. unsupervised mode: image clustering and cluster grouping
5. Post-processing: finishing geometric correction and filtering along with classification decorating.
6. Accuracy assessment: comparing classification results with results from field studies.

Figure 1. Supervised classification

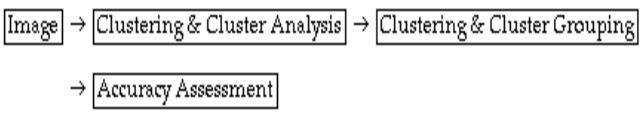

Figure 2. Unsupervised classification

To classify the images in to similar group or category, we must use any of the algorithms available. Here we are openhanded some recent research papers related to classify the flower images.

Dr.S.M.Mukane et.al, proposed to have a method for classification of flowers using Artificial Neural Network (ANN) classifier. They proposed a method which was based on textural features such as Gray level co-occurrence matrix (GLCM) and discrete wavelet transform (DWT). Using a threshold based method a flower image was segmented. They used a database of flower images which is a combination of images captured by researchers or downloaded from World Wide Web. The ANN classifier has been trained using 50 samples in order to classify 5 classes of flowers. They achieved more than 85% classification accuracy using GLCM features only. The use of a neural network classifier for flower classification using DWT and GLCM has been demonstrated. The researchers used gray level features and used the back propagation algorithm to train the (ANN). Their database of consisted of 5 classes of flowers, each class consists of 10 flower images. They applied pre-processing -Resizing - Segmentation Image processing and features extraction as DWT and GLCM Feature Vector for Training and Testing Flower classification using ANN Classifier Flower Classification Using Neural Network Based Image Processing classes. They found that MLP offers 87% accuracy with GLCM features.

Fadzilah Siraj et.al., conducted a study with a dataset consists of 180 patterns with 7 attributes for each type of flower has been gathered. The finding from the study reveals that the number of images generated to represent each type of flower influences the classification accuracy. One interesting observation is that duplication of very hard to learn images assist Neural Network to improve its classification accuracy. This is also another area that could lead to better understanding towards the behaviour of images when applied to Neural Network classification.

D.S. Guru et.al., investigated the effect of texture features for the classification of flower images. They segmented a flower image through eliminating the background and thus making use of threshold-based method. They extracted texture features, namely the color texture moments, gray-level co-occurrence matrix, and Gabor responses then made combinations of these three features in classification of flowers. They used a probabilistic neural network as a classifier. They used 35 classes in their own dataset where each set included 50 samples in order to verify efficiency of the proposed method.

The data set used consisted of different flower species that have similar appearance (small inter-class variations) across different classes and varying appearance (large intra-class variations) within a class. Images of flowers are captured by different posture, with messy background under various lighting situations and climatic conditions. In order to study the effect of classification accuracy they conducted experiment for several sizes of the datasets. The results showed that the combination of multiple features massively improve the performance for 44%, from 35% for the best single feature to 79% for the combination of all features. In order to spotlight the power of the proposed method. The study also gave a qualitative comparative analysis of the proposed method with other recognized existing flower classification methods.

Even though most of researchers are using the classification algorithms to group the image like Decision tree, Naïve bayes, Neural Networks, Support vector Machine and so on. O the other hand, in the fraction of computer engineering, use of the Arduino board, with the help of resistance and set the values to each flower, coding to match the resistance values to the flowers and we can recognize the flower. This process can be done with the following steps.

Step 1: Setup Arduino board as shown in the Figure 3.

Arduino UNO R3 or anything that has a computer brain. 10k Ohm Resistor Wires

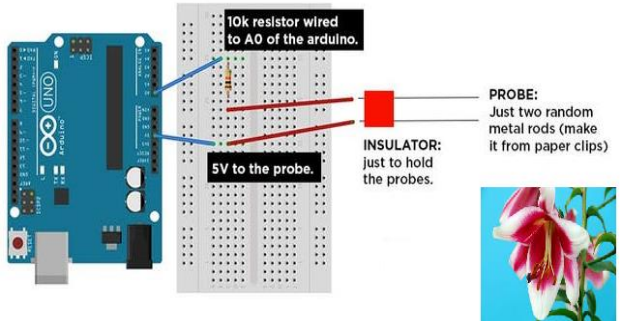

Figure 3. Setup of Arduino board

Step 2: begin Coding

Different flowers have different resistance, and that is the case for most of flowers. Just put it into ((if and else loop)), check the resistance range of variant flowers using serial output. Make a range by using resistances of flowers. Flower name will be the serial output while the resistances will act as training phase in real flowers.

Google Goggles has been mainly deceased since 2014 and had no updates for three years, and utilities it carried were altered or moved or merged into existing apps. Google has revealed a valuable replacement to the idea in the form of Google Lens as announced at I/O, the new system will provide relative information about objects visually, such as flowers user takes pictures of, or text user points his phone at.

Google Assistant responds to questions about weather and traffic, and can also link between things like personal calendars and Gmail accounts. Sundar Pichai said that Lens will also be integrated into Google's popular mobile photo sharing app, Google Photos, which has 500 million active users. Google Lens enables users take images that appears through the camera of a phone, and the app will understand what it is looking at and provide information based on the image. For example, Lens could look at an image of a flower, it will tell users what type of flower they are looking at. "This is about computers understanding images," Sundar Pichai added. Google Lens can be a classifier is describing in detail in next section.

III. GOOLE LENS AS AN IMAGE CLASSIFIER

Google announced Google Lens, with which Google can "understand what we're looking at and help us take action," CEO Sundar Pichai said. "We can give you the right information in a meaningful way." New Google's Lens enables users to search with their phone's camera. Its augmented reality further than photo filters. Google launched Lens at first in the Assistant, its digital helper software, and in Google Photos. It will be available at an unspecified date "later this year."

Google's new Lens tool is perfect for image classification as can be understood from the statements of Google CEO Sundar Pichai at Google's I/O conference that will be available for Google Assistant and Google Photos users. Google Lens is expected to understand, and state, exactly what is in a given photo. By using computer learning, Lens will be able to make analysis of the images and provide real-time information and suggestions. As a demo, he showed the tool labeling a photo of a flower (https://www.youtube.com/watch?v=neB1S0UPJFw). The feature provided types the flower is likely to be and also suggested a closly florist. Sundar Pichai noted that these machines can learn and function. Google's image-recognition technology has enhanced noticeably. In such a way that it can decide what is in a given image with more accurate than its user.

It is stated as once we add the pictures either from gallery (database) or capturing through camera in mobile, Google Lens give the details about the image. For example, we add the picture of Lilly, the Google Lens return the attributes of Lily like color and type as shown in figure 4.

So we can extract the features from images and classify the images as it belongs to which group. Google Lens can do the classification tasks very efficiently.

The steps involved in Image Classification using Google Lens are below.

1. Add the flower image (From Database or Capturing via Camera).
2. Get the images attributes and its group.
3. Store the image as per its group.

Figure 4. Attribute of Lily color and Type

IV. RESULTS AND ANALYSIS

Whenever we are using classification algorithms, the result is in the terms of accuracy. Normally, the accuracy is varying from algorithm to algorithm and datasets to datasets as well as tool to tool. So Google Lens can be the best Image classifier. Google Lens App is download from GooglePlayStore in Samsung J7 and experiments were conducted. While using Google Lens for image classification, we found different categories of results. It is perfectly classified the images which are captured via Google Lens in mobile. For example Guava and coconut images are captured and the results are flawlessly matched and shown in Figure 5 and 6 respectively.

Figure 5a. Capture the Guava in Google Lens

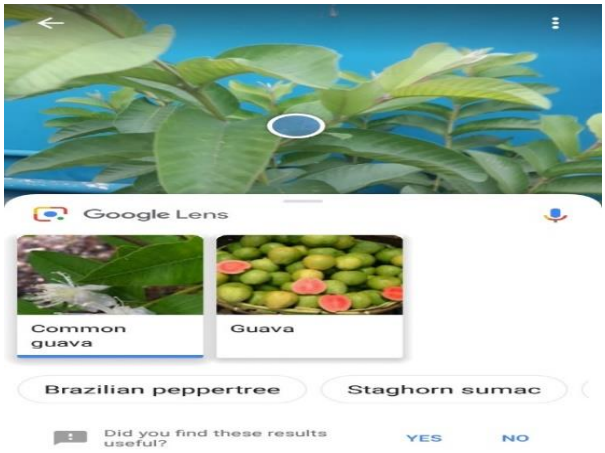

Figure 5b. Guava and its types in Google Lens

Figure 6 a: Capture the coconut in Google Lens

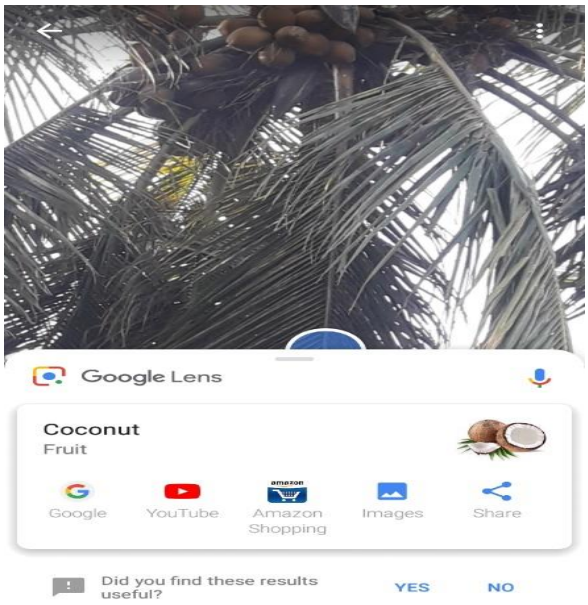

Figure 6b. Coconut and its types in Google Lens

On the other hand, same way pomegranate was focused and it gave the results as perfectly while capturing on fruit. But capturing on flowers, Google Lens produces irrelevant options as shown in Figure 7. Also mint leaves are captured and results was irrelevant options and gave the message as "Not Sure. These results might Help" as shown in Figure 8. In Figure 9, Aloe Vera was captured and get appropriate options are displayed.

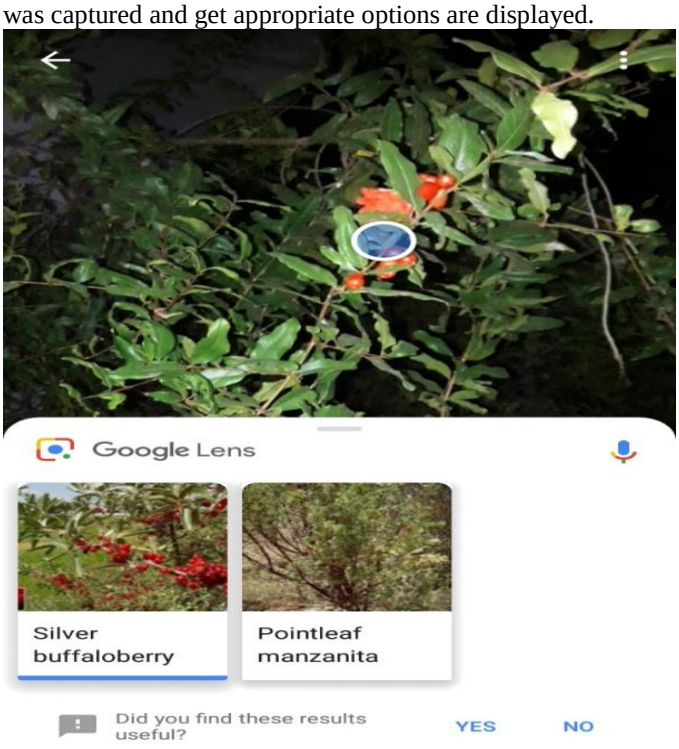

Figure 7a: Example for result with irrelevant options

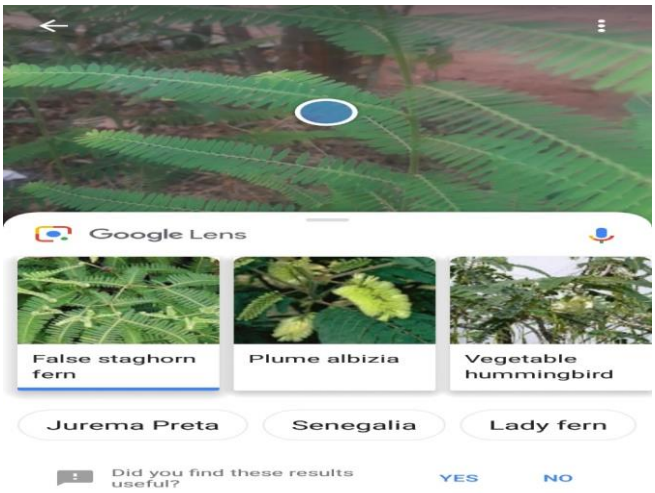

Figure 7a: Example for result with irrelevant options

Figure 8: Example for result with irrelevant options and Alert

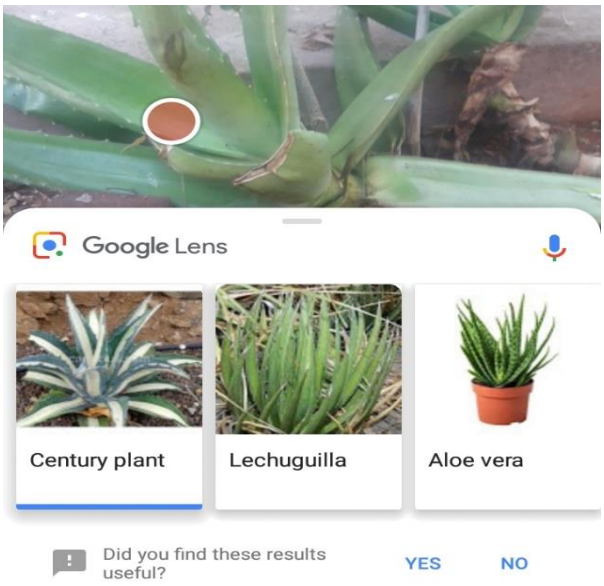

Figure 9: Example for result with relevant options

Accordingly Google Lens advantages and disadvantages are described with the few discriminating examples which were fronting in analysis. For the above example, the drawbacks of Google Lens can be improved by its feature selection algorithms and training of classification algorithms. Because Feature selection algorithm selected the most relevant features of images and training the datasets by classification to be effective.

V. CONCLUSION

In this paper, we have proposed the latest Mobile App, Google Lens as an Image Classifier explored for the purpose of flower classification. It is observed that using the Google Lens can achieve relatively a good classification accuracy when compared to any other available features. We have developed a new database of 20 classes of flowers, each class contains 150 flower images and experimented images of different datasets size we recorded the size effect on the classification accuracy. The experimental results have shown that using combined features outperforms any individual feature. It is a hope that the image-processing task in this study will be further enhanced or new methods will be applied to obtain better representation of the feature extraction. In order to further improve, the study of using the other samples into account can be considered.

REFERENCES

[1] D.S. Guru et.al., "Textural features in flower classification", Mathematical and Computer Modelling, Elsevier, Volume 54, Issues 3–4, August 2011, Pages 1030–1036
[2] Dr.S.M.Mukane et.al, "Flower Classification Using Neural Network Based Image Processing", IOSR Journal of Electronics and Communication Engineering (IOSR-JECE) e-ISSN: 2278-2834,p- ISSN: 2278-8735.Volume 7, Issue 3 (Sep. - Oct. 2013), PP 80-85.
[3] Fadzilah Siraj et.al., "Flower image classification modeling using neural network", International Conference on Computer, Control, Informatics and Its Applications (IC3INA), IEEE Xplore 2015.
[4] http://nymag.com/selectall/2017/05/google-lens-photo-tool-can-identify-images-and-offer-info.html
[5] https://www.cnet.com/news/google-lens-is-augmented-ar-you-can-actually-use-snapchat-facebook-instagram/
[6] http://fortune.com/2017/05/17/google-lens/
[7] https://create.arduino.cc/projecthub/crispylol/food-detector-6178cc